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General Notes.

MINERALOGY AND CRYSTALLOGRAPHY.[1]

Lewisite and Zirkelite.—Hussak and Prior[2] have given these names to two new Brazilian minerals. The lewisite, named in honor of Prof. W. J. Lewis, of Cambridge, Eng., was obtained from the cinnabar mine of Tripuhy in the gravel occurring on a hill-slope near Ouro Preto, Minas Geraes, Brazil. Xenotime, cinnabar, monazite, zircon, kyanite, tourmaline, rutile, hematite, pyrite, magnetite, gold, lewisite and a new titano-antimonate of iron, not yet obtained in quantity sufficient for accurate determination, constitute the heavy sand obtained by washing the gravel with a "batea." Lewisite occurs in perfect honey-yellow to brown octahedra, seldom exceeding 1 mm. in diameter. Twinning on the plane 111 is rare. Translucent, isotropic, streak light yellow-brown, cleavage octahedral, hardness 5.5, lustre vitreous to resinous, specific gravity 4.95. A pulverulent sulphur-yellow decomposition product was sometimes observed on the surface and in cavities inside the crystals. The results of an analysis and the theoretical composition of 5 CaO, 3 Sb_2O_5, 2 TiO_2 are given as follows:

Sb_2O_5	67.52	68.42
TiO_2	11.35	11.70
CaO	15.93	19.88
FeO	4.55	
MnO	.38	
Na_2O	.99	
	100.72	100.00

The lewisite is thus most closely related to Mauzeliite, an isometric mineral described by Sjögren (Geol. Fören. Förhand. Stockholm, XVII, pp. 313–318, 1895). Mauzeliite is brown, with Sp. G. 5.11, and gave, on analysis, Sb_2O_5 59.25, TiO_2 7.93, PbO 6.79, FeO .79, MnO 1.27, CaO 17.97, MgO .11, K_2O .22, Na_2O .27, H_2O .87 and F 3.63 (by difference?). The Swedish mineral contains much more lead and fluorine and less iron than that from Brazil.

The name zirkelite is given to a black, isometric, nearly opaque titano-zirconate of calcium and iron which occurs in the form of octahedra with baddeleyite, perofskite, etc., in the decomposed magnetite-pyroxenite of Jacupiranga, Sao Paulo, Brazil. Its density is 4.706, its hardness 5.5, and an analysis gave ZrO_2+TiO_2 79.79 (48.90+30.89?), FeO 6.64, CaO 11.61, MgO .49, loss on ignition 1.02, total 99.55. Note of this mineral without proposal of a name was earlier made by Hussak in Tschermak's Min. Pet. Mitth., XIV, pp. 408–410.

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[1] Edited by Prof. A. C. Gill, Cornell University, Ithaca, N. Y.

[2] Min. Mag., Vol. XI, Sept., 1895, pp. 80-88.

Epidote and Zoisite.—In connection with a somewhat detailed study of four alpine occurrences of epidote and zoisite, Weinschenk[3] proposes the name *clinozoisite* for those monoclinic members of the zoisite-epidote group which approach zoisite in chemical composition, are optically positive, and have a less index of refraction and a less double refraction than ordinary epidote. A beautiful new occurrence of clinozoisite at the Goslerwand in the Tyrol furnishes crystals of a delicate rose-red color. Their crystal form coincides with that of epidote. An analysis gave:—

SiO_2	39.06
Al_2O_3	32.57
Fe_2O_3	1.68
FeO	.29
MnO	trace
CaO	24.53
H_2O	2.01
	100.14

The indices of refraction are $\alpha=1.7176$, $\beta=1.7195$, and $\gamma=1.7232$. Hence the double refraction $\gamma-\alpha=.0056$, which is the lowest value ever recorded for a monoclinic epidote. The optical angle is:—$2V_{Li} = 80° 50'$, $2V_{Na} = 81° 40'$, and $2V_{Tl}$ = about 83°. Sp. G. 3.372.

The Monoclinic Pyroxenes of New York State.—These, with the exception of wollastonite, are quite fully discussed by Ries,[4] who gives also an extended bibliography of the subject. The aluminous augites of New York show more frequently an exception than an agreement with Tschermak's suggestion that Ca is less than Mg+Fe. Most of the large mineral collections which were likely to contain much material from New York were consulted in the course of these studies, so that the list of localities is doubtless very complete.

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[3] Zeitsch. f. Kryst., XXVI, pp. 156–177, 1896.

[4] Annals N. Y. Acad. Sci., IX, pp. 124–178, June, 1896.

On the Zonal Structure of Crystals.—Pelikan[5] discusses the peculiarities of augite, barite, cassiterite, calcite, tourmaline and fluorite as regards their growth in zones. Of these, the first two are especially interesting. The literature on the hour-glass and zonal structure of augite is reviewed, after which are given the results of work on the well-known "hourglass" augites of Nordmark. This structure has been shown to be due to the varying conditions of deposition on the various faces of a growing crystal. That portion of the augite substance which was deposited on the orthopinacoid is found to be darker in color and to have a larger angle between ċ and c than the material which grew on the base or orthodome. In the darker portions this angle is greater for violet than for red rays, while in the lighter parts the reverse is true. Etched figures show a hemihedral symmetry for some pyroxenes, thus confirming observations that have been made, in rare cases, on the crystal form. In barite the crystal faces show a selective force, so that hematite and cinnabar, for instance, are found chiefly on the macrodome (101). So far as known, there are always other than isomorphous molecules present in those cases where different substances are deposited on different face.

After classifying the various causes of zonal distribution of color in crystals, the conclusion is drawn that hourglass structure is never caused by an intermixture of isomorphous substance, but by the presence of some differently crystallizing coloring matter, or by a "dilute color."

Miscellaneous Notes.—With the close of the year 1896, came the last brochures of the second volume of Hinze's *Handbuch der Mineralogie*, already referred to in the NATURALIST, Vol. XXV, 1891, p. 577. This second volume (the first has not yet been published) treats only the silicates, devoting more than 1800 pages to the discussion of these minerals alone. It is by far the most complete, as well as the most recent, work of its kind. The appearance of the first volume will be looked for with much anticipation by mineralogists. It is published by Veit & Co., Leipzig.

A. P. Brown[6] finds, on some unprecedentedly fine molybdenite crystals from Frankford, Pa., the axial ratio a : c=1 : 1.908. The faces observed are: c (0001, °P), o ($10\bar{1}1$, P), p ($20\bar{2}1$, 2P), q ($30\bar{3}1$, 3P), and m ($10\bar{1}0$, ∞ P). The angle c : p=77° 13′. The pyramid p ($20\bar{2}1$)

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[5] Tschermak's Min. Pet. Mitth., XVI, pp. 1–64, 1896.

[6] Proc. Acad. Nat. Sci. Philadelphia, 1896, pp. 210–211.

is more common than the unit pyramid. The etched figures on the base indicate hexagonal, or possibly rhombohedral symmetry.

In agreement with the observations of de Bournon, Bauer and others, Judd[7] considers the structural planes of corundum to be not true cleavages, but simply planes of parting. Those parallel to 0R (0001) and $\infty P2$ $(11\bar{2}0)$ are thought to be normal solution planes, while the set parallel to R $(10\bar{1}1)$ are explained as gliding planes which, after the gliding under pressure, have become secondary solution planes. Observations on the shape and crystallographic position of the solution cavities are recorded. These are either empty or filled with the products of alteration.

Spencer[8] gives a full list of the literature of enargite, as well as of its places of occurrence. He cites for the first time the ten new planes, (610), (520), (540), (230), (108), (207), (709), (301), (601) and (054). Of these (610) and (601) are noted as doubtful. The mineral clarite (Sandberger, N. J. B., 1874, p. 960 and 1875, p. 382) is considered to be identical with enargite.

The relationships of the members of the humite series are reviewed by Lewis,[9] who brings the orthorhombic pyroxenes, as well as olivine, into the discussion. Besides the well-known progression in the axial ratios, the remarkable fact is noted that the twin face in all these minerals is parallel to the b axis, and in all except clinohumite it makes an angle of about 30° with the base (001). In clinohumite it has a position about at right angles to that in the other minerals. Another common feature is the great predominance of forms lying in the zones 010, $\bar{1}10$ and $\bar{2}10$. The minerals are similar in density, hardness and fusibility. The moleculare volumes are:—

Enstatite,	32.8	=	$\frac{3}{2} \times 21.9$
Olivine,	44	=	2×22
Chondrodite,	105.6	=	5×21.1
Humite,	150	=	7×21.4
Clinohumite,	182.1	=	9×20.2

(*Note.*—The molecular volume of clinohumite is probably too low, as given here. From the first three minerals one might compute the volumes of MgO (11.2), SiO_2 (21.6), and $Mg_2O\ (OH, F)_2$ (28.8). This would give for humite the molecular volume 149.6, and for clinohumite, 193.6.)

[7] Min. Mag., Vol. XI, Sept., 1895, pp. 49–55.

[8] Min. Mag., Vol. XI, Sept., 1895, pp. 69–79.

[9] Min. Mag., XI, Oct., 1896, pp. 137–140.